Hisao Tokizaki (ed.), Sapporo University.

Head Parameters and Word Stress in German

Jiro Inaba
The University of Tokyo

Hisao Tokizaki
Sapporo University

ABSTRACT. In this paper, we try to derive the word order patterns or the values of the so-called head parameters in German from stress location in the language. Following some of the relevant research, we assume that the word stress typically falls on the first vowel of the base morpheme in German and that this pattern of stress location in words is projected onto phrases. Also assuming that stress is placed on the most deeply embedded element (usually the complement rather than the head, cf. Cinque 1993), we can derive the ordering patterns within phrases projected both from function words (D, C, P), which basically bear no stress, and from content words (V, A), which bear word stress. If our proposal is on the right track, we can eliminate the head parameter from the syntax, a desirable result in keeping with the newer trend in generative theory.*

Keywords: affix, complement, German, head, stress, word order

1. Introduction

German is known to be a language in which the values of the so-called head parameters are not uniform; VPs, for example, basically have a head-final structure, while the majority of PPs are head-initial, i.e. prepositional. Within the framework of the (pre-minimalistic) principles and parameters approach, this state of affairs was just stipulated for each syntactic category, or at best described as "[+V]-categories are head-final and [-V]-categories head-initial" (cf. Grewendorf 1988: 52). Chomsky (1986: 2f), for example, mentions that in the following X-bar scheme, the order is "parametrized":

(1) a. X' = X X"*
b. X" = X"* X'
("X* stands for zero or more occurrences of some maximal projection")

In general, the head parameter values were regarded as syntactic primitives that determine the linear precedence relationship between heads and non-heads within the syntactic component.

With the advent of the minimalist program, however, researchers have been trying to make the (narrow) syntactic component as simple as possible, which results in the "strong minimalist thesis" (cf. Chomsky 2001, 2004): For one thing, the syntactic component should contain only hierarchical structures but no linear information. For another, the syntactic component should be universal, and the differences among languages are to be attributed to the PF (and the lexicon). This leads naturally to the assumption that the linear precedence

* This is a paper based on our talk at the JGG (Japanische Gesellschaft für Germanistik) conference held at Hiroshima University on 30 September 2017. We would like to thank the audience whose comments were very helpful. This work was supported by KAKENHI 15H03213.

relationship or the directionality parameter is not a matter of syntax. Chomsky (2012: 55), for example, says:

(2) [...] take the head parameter – it looks like the most solid of the macroparameters[1] [...], although it's not really solid because while there are languages like English and Japanese where it works, a lot of languages mix them up and one thing works for noun phrases and something else with verb phrases, and so on – but even that, that is a linearization parameter, and linearization is probably in the externalization system. There's no reason why internal computation should involve linearization; that seems to be related to a property of the sensory-motor system, which has to deal with sequencing through time. So it could be that that too is an externalization parameter. (emphasis by JI & HT)

Chomsky thus seems to take the traditional directionality parameter to be operating in the PF component or as a process of externalization (cf. also Chomsky 2005: 5, etc.). A similar idea is advocated, for example, by Bobaljik (2002), Richards (2004), and others. What these authors have in common is that the directionality parameter or the linear precedence relationship between heads and non-heads is still regarded as a primitive that has to be stipulated for each language or even, within a language, for each category.

In this paper, we would like to propose that, focusing on German, word order patterns can be derived from the word stress pattern in the language and that we can thus dispense with the head parameter, whether it is syntactic or phonological. We argue, specifically, that the basic word-stress pattern in the language is projected to the phrasal stress pattern, which determines the head-complement order for the relevant syntactic categories. If our argumentation is on the right track, it not only lends further support to the minimalist thesis that syntax is free from word order, thus contributing to the simpler syntax, but also explains why certain head parameters take the values they do.

The present paper is organized as follows: In section 2, we illustrate word order patterns in German. Section 3 demonstrates that German in principle has stem-initial stress in words, compounds and phrases. In section 4, we argue that the stem-initial stress pattern determines word orders in German, which are head-initial in DP, PP and CP and head-final in AP and VP.

2. Word order patterns in German

In this section we overview some of the word order patterns in German that will be explored in this paper. We begin with function words or closed-class words: D and C are unequivocally head-initial:

(3) D > XP;
a. die Arbeit
the work

[1] On macroparameters, see Baker (2008).

b. *Arbeit die

(4) C > XP;

a. (ich glaube,) dass [Eric heute kommt]
(I believe) that [Eric today comes]
'I believe that Eric will come today.'

b. (Ich glaube,) *[Eric heute kommt] dass

Another functional category that is often assumed in the generative literature is I(nfl) or T(ense). In contrast with the situation in English, however, it is not clear in German whether I/T is occupied by some element with phonological substance or even whether it exists at all (see e.g. Haider 2010). We will not discuss this functional category any further here.

Ps (adpositions) in German are not as simple as those in English. Although prepositions are generally regarded as closed class words, it is not always clear whether certain words are to be classified as prepositions. According to Duden (1998: 383), the number of prepositions varies considerably, from 50 to more than 100. This is related to whether some borderline cases are treated as prepositions or not (e.g. *südlich* der Alpen, 'south of the Alps', *mithilfe* des Computers, 'with the help of the computer', etc.). Duden (1998: 383) points out that "there are only about 20 prepositions that frequently appear", as listed below:

(5) an ('at'), auf ('on'), aus ('from'), bei ('by'), bis ('till'), durch ('through'), für ('for'), gegen ('against'), hinter ('behind'), in ('in'), mit ('with'), nach ('after'), neben ('beside'), über ('over'), um ('around'), unter ('under'), von ('of'), vor ('before'), zu ('to'), zwischen ('between')

While German is thus basically a prepositional language, Duden (1998: 829f) points out that the prepositions in (6) can be used also postpositionally. The preposition *nach* ('after') can be used as a postposition only in the modal usage ('according to'). Listed in (7) are the postpositions which cannot precede but only follow a nominal:

(6) entgegen ('toward'), entlang ('along'), gegenüber ('across from'), gemäß ('according to'), unbeschadet ('regardless of'), ungeachtet ('regardless of'), wegen ('because of'), zufolge ('as a result of'), zugunsten ('in favor of'), zunächst ('nearst'), zuungunsten ('to the disadvantage of')

(7) halber ('for the sake of'), zuwider ('contrary to')

Some of the relevant data are given below:

(8) P > XP;

a. in Frankfurt

b. *Frankfurt in

(9) P > XP & XP > P;
a. gegenüber dem Bahnhof
across-from the station
b. dem Bahnhof gegenüber

Let us now turn to content words: Verbs in German are in principle head-final, although in colloquial speech, PPs can occasionally show up postverbally (signaled by "#" in (11b)):

(10) DP > V;
a. (dass er zu Hause) [viele Bücher] liest
(that he to house) [many books] reads
'that he reads many books at home'
b. (dass er zu Hause) *liest [viele Bücher]

(11) PP > V, #V > PP
a. (weil Günther) draußen [auf Simon] wartet
(because Günther) outside [on Simon] waits
'because Günther is waiting for Simon outside'
b. (weil Günther) #draußen wartet [auf Simon]

The situation is relatively complicated with adjectives. In this paper, we concentrate on adjectives in predicative use (for word order patterns with attributive adjectives, see Tokizaki & Inaba 2017). When the complement is a DP, the adjective must appear head-finally, while with PP-complements the adjective can basically be both head-initial and head-final:

(12) DP > A
a. (Anton ist) [seinem Vater] ähnlich
(Anton is) [his father]$_{Dat}$ similar
'Anton is similar to his father.'
b. (Anton ist) *ähnlich [seinem Vater]

(13) PP > A, A > PP
a. (Eric ist) [auf die Kinder] stolz
(Eric is) [on the children] proud
'Eric is proud of his children.'
b. (Eric ist) stolz [auf die Kinder]

Word order variation within DPs will not be dealt with in this paper. The linear order of the nominal head and the non-head is so variable, dependent on the argument status and/or the syntactic category of the latter, that a complete discussion of this matter will have to be left to future research. In addition, the distinction between argument and adjunct is not always self-evident within nominals (cf. e.g. Grimshaw 1990). Specifically, with respect to the first point, DPs, PPs and (finite and non-finite) CPs appear post-nominally, whether they are "complements"

or adjuncts, whereas APs and (participial) VPs, which are all adjuncts, appear prenominally:[2]

(14) a. (die) Zerstörung [$_{DP}$ der Stadt]
(the) destruction [$_{DP}$ the city]$_{Gen}$
'the destruction of the city'
b. *[$_{DP}$ der Stadt] Zerstörung

(15) a. (die) Hoffnung [$_{PP}$ auf Frieden]
(the) hope [$_{PP}$ on peace]
'the hope for peace'
b. (die) *[$_{PP}$ auf Frieden] Hoffnung

(16) a. (der) [$_{AP}$ [auf die Kinder] stolze] Vater
(the) [$_{AP}$ [on the children] proud] father
'the father proud of his children'
c. (der) *Vater [[auf die Kinder] stolze]
d. (der) *Vater [stolze [auf die Kinder]]

For some aspects of word order patterns with head noun and prenominal modifiers, see Tokizaki & Inaba (2017).

We can now summarize the previous observations as follows:

(17) a. head initial: D, C, P, (A?)
b. head-final: V, A, (P?)

Once abstracting away from nominals, whose headedness is murky, we can derive the generalization that head-initial categories are function words, which are usually unstressed, while head-final structures are found with content words bearing word stress. This observation will play an important role in our explanation of the relevant data in section 4.

3. Stress patterns in German

In this section, we recapitulate relevant aspects of stress patterns in German. We discuss the location of stress in words, compounds and phrases.

---

[2] In determining the value of the head parameter, it is usually the complement and not the adjunct whose positioning relative to the head X is checked within the XP. In the case of German, what are regarded as complements to nouns appear postnominally, while the positioning of the adjuncts is dependent on their syntactic categories. The most typical adjuncts or modifiers of a nominal are surely APs including participial phrases, which are placed prenominally in German.

Lawyer (2015) now claims, based on empirical data, that for the word order typology within VPs, the position of the oblique phrase with respect to the head is a better indicator than that of the direct object in classifying languages as head-initial or head-final. If his argumentation is on the right track, it will not be an easy task to determine the head parameter value of the nominals in German.

3.1. Word stress

In this subsection, we present some of the previous researches that deal with word stress in German. For native German words, Wurzel (1980: 301f) observes the following word stress patterns:

(18) The main stress[3] on the (first) vowel of the base morpheme and no secondary stress:
ˈGarten, ˈfinster, Beˈricht, etc.

(19) The main stress on the (first) vowel of the base morpheme and a secondary stress after that:
ˈAmeise, ˈHündin, ˈSchreibung, etc.

(20) The main stress on the (first) vowel of the base morpheme and a secondary stress on the (first) vowel of the prefix:
entˈscheiden, Erˈzählung, etc.

(21) The main stress on the vowel of the prefix and a secondary stress on the (first) vowel of the following base morpheme:[4]
ˈunglücklich, ˈMißgunst, ˈUrmensch, etc.

These stress patterns result from a group of stress rules proposed by Wurzel (1980: 302f), which include the following rule as the most basic one:

(22) In native base morphemes, the vowel of the first syllable gets a main stress.

The above observations show that apart from a couple of stressable prefixes (cf. (21)), the word stress typically falls on the first vowel of the base morpheme in German, as represented in the schema below:

(23) $[_{word}$ (prefix) $[_{stem}$ ...
(σ) σ σ ...
(weak) strong weak ...

We follow this idea as a prerequisite for the analysis we put forward in section 4. (See Halle & Keyser 1971 and Lahiri et al. 1999 for stem-initial stress in the history of Germanic languages.) On the other hand, Jessen (1999), and Goedemans & van der Hulst (2005) argue that German has right-oriented stress (antepenult, penult or ultimate stress). However, the alleged righthand stress in German is due to borrowing from Romance languages. We argue that German still

[3] Wurzel (1980) uses here the term *Hauptakzent* (‘main accent’). Because we are dealing only with languages in which the accent is realized as stress, we rephrase Wurzel’s *Akzent* as “stress” in our English translation. For various factors concerning accent including stress, pitch and duration, see van der Hulst, Goedemans & Zanten (2010: 9).

[4] Wurzel (1980: 302f) calls this kind of stressable prefix “nominal prefixes”. For some aspects of this type of prefix, see also Kiparsky (1966).

keeps stem-initial stress as the unmarked stress location for words in general.

3.2. Stress in compounds and in phrases

In this subsection, we discuss the stress location in compounds and phrases in German. Stress in compound words is straightforward; it is on the stressed syllable of the first component word, as shown in (24) (cf. Wiese 1996: 296):

(24) a. ˈSpiel + ˈUhr → ˈSpieluhr
play clock music box
b. ˈrot + ˈWein → ˈRotwein
red wine red wine

Note that compounds with an unstressed prefix have stress on the stem-initial syllable of the first component word:

(25) a. Beˈruf + ˈAusbildung → Beˈrufsausbildung
job training job training
b. Entˈscheidung + ˈTräger → Entˈscheidungsträger
decision bearer decision maker

In German phrases, the main stress falls on the complement rather than on a head:

(26) a. [PP nach ˈFrankfurt]
b. [DP das ˈHaus]
c. [VP ˈBücher lesen]

Stress location in compounds and phrases in German can be captured by a rule which assigns the main stress to a non-head (Duanmu 1990) or to the most deeply embedded element in the syntactic structure (Cinque 1993).

3.3 Holistic typology: stress location and word order

In the holistic approach to language typology, it has been argued that the stress location in words parallels that in compounds and phrases, and that stress location correlates with the order of head and complement (for a historic overview of holistic typology, see Plank 1998). Bally (1944) observes that in German stress falls on the initial position of words, compounds and phrases, while in French stress falls on the final position of these categories. He argues that German has anticipatory rhythm (strong-weak) and head-final order (e.g. adjective-noun, genitive-noun, OV) while French has progressive rhythm (weak-strong) and head-initial order (e.g. noun-adjective, noun-genitive, VO). Also, in studying Austroasiatic languages, Donegan & Stampe (1983) argue that Munda languages have initial stress in words, compounds and phrases, and head-final order, while Mon-Khmer languages have final stress in words, compounds and phrases, and head-initial order.

Although Bally's idea that German has both initial stress and head-final order is insightful, we need to explain the fact that German has head-initial order in DP, PP, and CP, on the one hand, and head-final order in AP and VP, on the other, as we have seen above in Section 2. In Section 4, we argue that the stem-initial (rather than word-initial) stress allows German to have head-initial order if the head is a function word without stress (D, P and C), which is like a prefix without stress.

3.4 Rhythm constraints

Before discussing the stress and word order in German, let us review rhythmic constraints in languages. It has been argued that languages have two kinds of constraint, *Clash and *Lapse, which we represent as (27) (cf. Selkirk 1984: 52, Kager 2007: 199):[5]

(27) a. *Clash: *.. s s ..
b. *Lapse: *.. w w .. (or *.. w w w ..)

*Clash (27a) bans adjacent stressed syllables. *Lapse (27b) may have variation in its strictness: it bans a sequence of two or three weak syllables. We could also admit the degrees in violation of *Lapse if we count the number of syllables violating them. For example, "w w w" is worse than "w w" and better than "w w w w". In the next section, we argue that these rhythmic constraints together with the stem-initial stress pattern in German determine the head-initial or head-final order in compounds and phrases in the language.

4. Stress and word order

In this section, we try to provide an account for the observed word order patterns in German, based on the language-specific and universal properties of stress location. The basic assumption we would like to build our analysis upon is that the stress location in a phrase correlates with that in a word (cf. sec 3.3). We should also call to mind, from the discussion of section 3.1, that word stress in German falls on the first syllable of the stem morpheme in principle.

4.1. DP

Let us now begin with function words, which basically do not bear word stress (cf. Fries 1952). In the case of DPs, the stress pattern should look like the following:

(28) a. die Arbeit
the work
w S w
b. *Arbeit die
S w w (*Lapse violation)

[5] We use "s" for strong and "w" for weak. We further differentiate "s", which represents word stress, from "S" for phrasal stress. See, for example, (35), which contains both of these.

The stress pattern in (28a) matches the typical stress pattern in German, "(w) s w" (cf. (23)), here the determiner functioning phonologically and morphologically like a prefix or clitic (*die-* ˈ*Arbeit*). If the determiner follows the noun, the resulting phonological representation (28b) is in violation of *Lapse (see sec. 3.4). That is, (28b) is not a phrasal stress pattern preferred in German.

Before going on with our analysis, some caveats are in order here. First, one might well argue that in the case of a monosyllabic head N, the order N+D does not violate *Lapse:

(29) a. das Buch
the book
w S
b. *Buch das
S w

On this point, we would like to claim that words in German are typically polysyllabic. Menzarath (1954) evaluates the total of 20,453 words listed in *Deutsches Aussprachewörterbuch* by Viëtor (1921)[6] according to the number of syllables in a word. One of his findings is summarized in the table below:[7]

(30) Menzarath (1954: 96), cf. Viëtor (1921), *Deutsches Aussprachewörterbuch*.

syllable(s)	1	2	3	4	5	6	7	8	9	total
words	2245	6396	6979	3640	920	214	42	11	6	20453
percent	11.0	31.3	34.1	17.8	4.5	1.0	0.2	0.1	0.0	100.0

This shows that most of the words in German are polysyllabic (89%). The phonological representation in (29), resulting from the N > D order, is surely legitimate per se, but it encompasses just a very small subset of the entire number of cases in question. The D > N order, on the other hand, comes off better than the reverse order in all the relevant cases, which leads to the fixed order D > N.

The same line of reasoning should hold good against the claim that the stress pattern represented in (28b), "S w w", is by itself not completely unattested in German, as for example in ˈ*Einladung* ('invitation'). Actually, two successive weak syllables in German do not automatically lead to ill-formedness, especially in the case of stress-neutral suffixes (e.g. 'Frei+heit+lich+keit, cf. Wiese 1996: 290). The point here is that the phonological representation in (28b) is ruled out because the alternative order, (28a), is completely free from the *Lapse violation; there is no reason to choose (28b) over (28a), which perfectly matches

[6] This is the third edition. The first edition was published in 1912.

[7] Menzarath (1954: 9) does not (or could not) exclude foreign words from his research, because "there are occasionally foreign words that are more familiar or even more appropriate than the corresponding German expressions".

the German stress pattern "(w) s w …" as shown in (23):[8]

4.2. PP

Let us next turn to the ordering pattern of adpositions and their complement. In most cases, i.e. with "canonical" prepositions, the order is fixed to P > DP, as in English (we use "(w)" for schwas):

(31) a. in Frankfurt
w S w
b. * Frankfurt in
S w w (*Lapse violation)

(32) a. mit dem Fahrrad
w (w) S w
b. * dem Fahrrad mit
(w) S w w (*Lapse violation)

The situation is similar to the case of the word order in DPs, D+N(P), as we saw above; the prepositions here, which are in principle not stressed, function phonologically like a prefix (e.g. *in-ˈFrankfurt*). The stress patterns represented here show that the prepositional structure, (31a/32a), matches the stress pattern canonical in German better than the postpositional one, (31b/32b).

This prosodic analysis of word order is supported by the fact that some prepositions can be contracted with definite articles in German (e.g. *zu der → zur*). According to Duden (1998: 323), they are: *an, auf, außer, bei, durch, für, hinter, in, neben, über, um, unter, von, vor, zu* (cf. (5) in section 2). Contracted forms with some of these prepositions are regarded as colloquial, although the borderline between standard language and colloquial speech is blurred (Duden 1998: 325). It is interesting to note that the PPs with a contracted form (33b), rather than a non-contracted form (33a), better correspond to the stress pattern canonical in German:

(33) a. zu der Arbeit
w (w) S w
b. zur Arbeit
w S w

It rather seems to be the case that the contracted variant is, at least phonologically, an unmarked option. This might well comply with the description in Duden (1998: 324) that "in many cases,

[8] In their positioning with respect to their complement, function words seem in general to be more rigidly regulated than content words. This might be related to the observation that function words behave in certain respects like affixes, i.e. elements that show up within the word-internal syntax or morphology, where there is less freedom in the ordering of morphemes. We can argue that the rhythm in a word is projected onto a phrase, where its constituents can have a more flexible order.

the break-up of the (historically developed and now lexicalized) contraction is not possible any more" (e.g. *zur* [not: *zu der*] *See fahren* 'go to the sea'). Then, the contraction of prepositions and definite articles, which is triggered by the avoidance of *Lapse violation, matches the stem-initial stress pattern in German.

We saw in section 2 above that there are adpositions that can occur postnominally in German. We repeat the list (6) and a pair of examples below:

(34) entgegen ('toward'), entlang ('along'), gegenüber ('across from'), gemäß ('according to'), unbeschadet ('regardless of'), ungeachtet ('regardless of'), wegen ('because of'), zufolge ('as a result of'), zugunsten ('in favor of'), zunächst ('nearst'), zuungunsten ('to the disadvantage of')

(35) a. gegenüber dem Bahnhof
w (w) s w (w) S w

b. dem Bahnhof gegenüber
(w) S w w (w) s w

We would like to ascribe the well-formedness of (35) to the assumption that the adposition here can constitute an independent prosodic word (or clitic group, cf. Nespor & Vogel 1986) separate from the complement DP. This should lead to the presence of a prosodic boundary between DP and P, which exempts (35) from the violation of *Lapse:[9]

(36) a. [pwd gegenüber] [pwd dem Bahnhof]
w (w) s w / (w) S w

b. [pwd dem Bahnhof] [pwd gegenüber]
(w) S w / w (w) s w

We can now observe that all the adpositions listed in (34) are polysyllabic and polymorphemic, so that they are "heavy" enough to build a prosodic word (or clitic group) of their own.[10]

Let us remember from the above discussion that some prepositions can be contracted with the preceding definite article. Based on the examples in (33), we claimed that the PP with contraction, (33b), better matches the canonical stress pattern in German, the contracted form functioning as an unstressed weak syllable. This should lead to the prediction that contraction is only possible with "light" adpositions, which is actually borne out. Those adpositions that are "heavy" enough to function also as postpositions, (34), cannot be contracted in the above sense (e.g. gegenüber dem Bahnhof → *gegenüberem Bahnhof).

---

[9] A monosyllabic (or short) preposition does not make a phonological word by itself. It must be cliticized to its host as in (31a) (*in-Frankfurt*).

[10] The postposition *nach* in the modal interpretation appears to be an exception. IDS (1998: 2084) gives *entsprechend* and *gemäß* as synonyms of it. In addition to these two, Duden (2002: 639) also lists *laut* and *zufolge*. Out of these four adpositions, all but *laut* can be postposed. It might be speculated that the availability of *nach* as a postposition is related to the analogy from this fact.

4.3. CP

The final function words to be dealt with are complementizers, which are also realized head-initially in German. We would like to claim that complementizers or subordinating conjunctions are generally derived from prepositions, demonstratives or the combination thereof. As for prepositions, we have already established their basic head-initiality by way of prosodic considerations. The declarative conjunction *dass*, the most typical of the complementizers, was originally the neutral demonstrative pronoun *das*, identical in form with the neutral definite article. It began to be differentiated orthographically only in the 16th century (Duden 2001: 135):[11]

(37) a. Ich sehe das: er kommt.
I see it he comes
'I see that he is coming.'
b. Ich sehe, dass er kommt.
I see that he comes

The conjunction *dass* was thus a cataphor, necessarily preceding the subordinated clause. The same reasoning may well apply to some of the subordinating conjunctions such as *nachdem* (*after-that*, 'after'). We cannot, however, deal with all the cases of subordinating conjunctions in detail here.

Thus, we can explain the fact that complementizers, which were historically prepositions or demonstrative pronouns, precede their complement clauses in terms of prosody.

4.4. VP

Let us now take up content words. They are different from function words in that they principally bear word stress (cf. Fries 1952). As observed in section 2, verbs are basically head-final in German. According to Nespor & Vogel (1986) and Cinque (1993), the complement should bear the phrasal stress in the structure containing the head verb and its complement:

(38) XP > V;
a. [viele Bücher] lesen
w (w) S w s (w)
b. * lesen [viele Bücher]
s (w) w (w) S w

(39) a. [nach Frankfurt] fahren
w S w s (w)
b. * fahren [nach Frankfurt]
s (w) w S w

[11] The origin of the interrogative complementizer, *ob*, is not clear (Duden 2001: 566).

The head-final structures, (38a) and (39a), better match the canonical pattern in German, where the main stress is located initially both in words and in phrases, the leftmost weak syllable, if present, functioning like an unstressed prefix.

A problem concerning the verb position arises when we take a look at another sentence type, the verb-second (V2) clause. Although it is generally acknowledged in theoretical linguistics that German is essentially a so-called OV-language, it is not rare to encounter matrix V2-clauses in which the verb, whether immediately or not, typically precedes the object. The reverse order is unacceptable:

(40) a. dass wir [viele Bücher] lesen
that we many books read
'that we read many books'
b. *dass wir lesen [viele Bücher]

(41) a. Wir lesen [viele Bücher].
b. *Wir [viele Bücher] lesen.

If the constituent ordering is determined on the basis of prosodic properties, as argued for in this paper, then our analysis seems to accept (41b), the O+V variant, and to rule out the opposite order, (41a), as was the case with the embedded clauses (40).

We would like to attribute this asymmetry between the above two types of clauses to the difference in prosodic phrasing. Wagner (2005: 330f) provides the following examples with their prosodic phrasing in brackets (the notions are slightly altered):

(42) a. (Sie hat) (einen Tango getanzt)
she has a tango danced
'She danced a tango.'
b. (Sie tanzte) (einen Tango)
she danced a tango

He claims that "Predicates following DP-arguments [...] are prosodically 'affixed' to the preceding domain" (42a) and that "When the predicate *precedes* the complement, two separate accentual phrases are derived" (42b). If this observation is correct, we can maintain that the verb and its complement in (41a) are located in different prosodic domains or prosodic phrases, as shown in (43a).

(43) a. (Wir lesen) (viele Bücher)
w S w / w (w) S w
b. *(Wir viele Bücher lesen)
w w (w) S w s w (*Lapse violation)

Because the stress pattern canonical in each language is valid only within a certain prosodic unit like prosodic word or prosodic phrase, the sequence V+Obj in (41a) is not relevant to the

stress patterning discussed in this paper.

Alternatively, we can try to derive the verb-second property of German from its prosody, especially its word-prosody (cf. Bošković 2016). Then, the unacceptability of examples such as (41b) can be explained in terms of prosody. We will leave this matter for our future research.

4.5. AP

Finally, let us look at the constituent orderings within APs, concentrating, as already mentioned, on predicative ones. We observed in section 2 that the DP-complement must appear to the left of the adjectival head, while PP-complements can in principal be located on either side of the adjectival head.[12] The examples and the relevant stress patterns are shown below:

(44) a. [seinem Vater] ähnlich
w (w) S w s w
his father similar
'look like his father'

b. * ähnlich [seinem Vater]
s w w (w) S w

(45) a. [auf die Kinder] stolz
w w S w s
on the children proud
'proud of his/her children'

b. stolz [auf die Kinder]
s w w S w

The question arises here concerning the difference between the DP- and the PP-complements that show up to the right of the adjectival head, (44a) vs. (45a).

We would like to tackle this problem based on the assumption that APs in German are basically head-final. When we look at each of the stress patterns in the above examples, the data in (44) seem to favor the head-finality of the AP, due to *Lapse (cf. (27b)). However, (45) does not provide us with any clues for determining the headedness of the AP, and the whole picture does not appear clear enough to classify one pattern as grammatical and the other as ungrammatical.

For this problem, we would like to point out some possible solutions. As the stress patterns in the examples above show, the whole AP has phrasal stress on the complement, borne either by a nominal or by a PP containing a nominal; the adjectival head has word stress but not phrasal stress. At the phrasal level, the AP thus has the most prominent stress on its complement. Let us now remember from the discussion in section 3 that German is basically a left-stress language, both in words and in phrases. This leads to the expectation that the most prominent stress in a phrase, the phrasal stress, is better placed on the left branch (46a) rather than the right

[12] Nakagawa (1999) points out, based on corpus research, that the preferred order of an adjective and its complement PP depends on the types of adjectives.

branch (46b):

(46) a. [$_{AP}$ [$_{XP}$ (w) S w ...] [$_{A}$ (w) s w ...]]
b. [$_{AP}$ [$_{A}$ (w) s w ...] [$_{XP}$ (w) S w ...]]

If the reasoning here is on the right track, we can conclude that the preferred order within APs in German is head-final, as represented in (46a) = (44a).

The next question that arises is why the PP-complements to an adjective can, in opposition to the DP-complements, appear to the right of the adjectival head (cf. (45b)). This observation can be related to the fact that, in spite of the head-finality of the VP in German, PPs can, especially in colloquial speech, be placed to the right of the verb (cf. (11b)). In the generative terminology, one might say that PPs can occasionally be extraposed into the post-field ('Nachfeld'). Within the government and binding framework, one may try to explain this state of affairs by claiming that verbs and adjectives can govern or Case-assign only regressively, i.e. to the left in German: DPs, which need Case (but not PPs, which do not) can thus appear only to the left of the Case-licensing heads. This is, however, not much more than the stipulation that verbs and adjectives in German are head-final. Moreover, the "head parameter" put forward in such an analysis is regarded as something situated in the narrow syntactic component, an assumption that we would like to avoid in our research (cf. section 1).

For this "exceptional" behavior of PPs, i.e. their possible extraposition, we would like to assume that the preposition functions as a linker to the relevant head (cf. Tokizaki & Inaba 2017: sec.4). In the case at hand, i.e. with PPs functioning as complements to adjectives, which preposition should be realized as the head of the PP-complement is predetermined, depending on the adjectival head. An adjectival head can thus identify its complement PP even when the latter has been extraposed.[13] Although the details must be left to further research, a mechanism of this sort seems in any case to be necessary in order to properly describe some of the phenomena subsumed under "extraposition" in German.

5. Concluding remarks

In this paper, we have tried to derive some of the word order patterns in German from the stress system observed in the language. We first reviewed the word order patterns across syntactic categories in German and pointed out that the values of head parameters are different between function-word phrases (DP, PP and CP) and content-word phrases (VP and AP). Looking over previous studies, we then recapitulated the stress pattern in German and followed the view that word stress typically falls on the first vowel of the base morpheme. We further

[13] We do not go into the problem of what constraints determine the extraposition (of PPs), like locality, rightwardedness, etc.

In Tokizaki & Inaba (2017: section 4), we argued that the relative clause can function as a modifier to the head noun even if the former is not placed in the position canonical for modifiers (i.e. in a prenominal position), because the relative pronoun, bearing morphological agreement with the head noun, helps identify the semantic relationship between the relative clause and the head noun.

argued that the stress pattern in words can be extended to compounds and phrases. Based on the above discussion, we claimed that word order patterns can be deduced from the stress system in the language.

References

Baker, Mark (2008) "The Macroparameter in a Microparametric World." In: Theresa Biberauer (ed.) *The limits of syntactic variation*. Amsterdam: John Benjamins: 351–373.

Bally, Charles (1944) *Linguistique Générale et Linguistique Française*. 2nd ed., Berne: Francke.

Bobaljik, Jonathan (2002) "A-Chains at the PF-Interface: Copies and 'Covert' Movement." *Natural Language and Linguistic Theory* 20: 197–267.

Biberauer, Theresa, Anders Holmberg, & Ian Roberts (2014) "A syntactic universal and its consequences." *Linguistic Inquiry* 45:169–225.

Bošković, Željko (2006) "On Verb Second and Clitic Second." Ms. University of Connecticut.

Chomsky, Noam (1986) *Barriers*. Cambridge, Mass.: MIT Press.

Chomsky, Noam (2001) "Derivation by Phase." In: M. Kenstowicz (ed.), *Ken Hale: A Life in Language*. Cambridge, Mass.: MIT Press: 1-52.

Chomsky, Noam (2004) "Beyond Explanatory Adequacy." In: A. Belletti (ed.) *Structures and Beyond: The Cartography of Syntactic Structures*, Vol. 3, Oxford UP: Oxford: 104-131.

Chomsky, Noam (2012) *The Science of Language: Interviews with James McGilvray.* Cambridge: Cambridge UP.

Chomsky, Noam & Morris Halle (1968) *The sound pattern of English*. New York: Harper & Row.

Cinque, Guglielmo (1993) "A null theory of phrase and compound Stress." *Linguistic Inquiry* 24, 239-298.

Donegan, Patricia Jane & David Stampe (1983) "Rhythm and the holistic organization of language structure." *Papers from the Parasession on the Interplay of Phonology, Morphology and Syntax*. Chicago: Chicago Linguistic Society: 337–353.

Duanmu, San (1990) *A Formal Study of Syllable, Tone, Stress and Domain in Chinese Languages*. Doctoral dissertation, Cambridge, MA: MIT.

Duden (1998) *Die Grammatik*. Mannheim: Dudenverlag.

Duden (2001) *Das Herkunftswörterbuch*. Mannheim: Dudenverlag.

Duden (2002) *Das Bedeutungswörterbuch*. Mannheim: Dudenverlag.

Elenbaas, Nine & René Kager (1999) "Ternary Rhythm and the *Lapse Constraint." *Phonology* 16, 273–329.

Fries, Charles (1952) *The structure of English*. New York: Harcourt Brace.

Grewendorf, Günther (1988) *Aspekte der deutschen Syntax*. Tübingen: Narr.

Grimshaw, Jane (1990) *Argument Structure*. Cambridge, Mass.: MIT Press.

Haider, Hubert (2010) *The Syntax of German*. Cambridge: Cambridge UP.

Halle, Morris & Samuel Keyser (1971) *English Stress: Its Form, Its Growth, and Its Role in Verse*. Harper & Row: New York.

Jessen, Michael (1999) "German." In: van der Hulst, H. (ed.) *Word Prosodic Systems in the Languages of Europe*. Berlin: Mouton de Gruyter: 515-544.

Kiparsky, Paul (1966) “Über den deutschen Akzent.” In: *Untersuchungen über Akzent und Intonation im Deutschen* (Studia Grammatica VII). Berlin: Akademie Verlag: 69-98.

Lahiri, Aditi, Thomas Riad & Haike Jacobs (1999) “Diachronic prosody.” In: Harry van der Hulst (ed.) *Word Prosodic Systems in the Languages of Europe*. Berlin: Walter de Gruyter: 335–422.

Menzerath, Paul (1954) *Die Architektonik des deutschen Wortschatzes*. Dümmler: Bonn.

Nakagawa, Hiroyuki (1999) “Keiyoshi to Zenchishikaku-Mokutekigo no Gojun.”(‘The word order of adjectives and prepositional objects.’) *Neue Beiträge zur Germanistik*. 102: 126-139.

Nespor, Marina & Irene Vogel (1986) *Prosodic phonology*. Dordrecht: Foris.

Noack, Christina (2016) *Phonologie*. Heidelberg: Winter.

Plank, Frans (1998) “The co-variation of phonology with morphology and syntax: A hopeful history.” *Linguistic Typology,* 2: 195–230.

Selkirk, Elisabeth (1984). *Phonology and syntax: the relation between sound and structure*. Cambridge, Mass.: MIT Press.

Tokizaki, Hisao (1999) “Prosodic phrasing and bare phrase structure.” *NELS* 29, vol. 1: 381-395.

Tokizaki, Hisao & Jiro Inaba (2017) “Word order and prosody in the adnominal modification structures.” In: H. Tokizaki (ed.) *Phonological Externalization.* Vol.2. Sapporo: Sapporo University: 45-52.

Tokizaki, Hisao & Jiro Inaba (2018) “Prosodic constraint on prenominal modification.” Ms. Sapporo University & Tokyo University.

Wiese, Richard (1996) *The phonology of German*. Oxford: Oxford University Press.

Wurzel, Wolfgang (1980) “Der deutsche Wortakzent: Fakten – Regeln – Prinzipien.” *Zeitschrift für Germanistik*. Vol. 1, Nr. 3: 299-318.